

## Red Cliff Health Clinic Erosion

Red Cliff TNR Division identified a 450ft long area of erosion between the Red Cliff Health Clinic and the Minobimaadiziwin Gitigaanin Tribal Farm following construction of the Health Clinic in 2014. The area of active erosion is part of a natural drainage that was altered during construction activities which subsequently allowed water to erode the length of the channel and into a hillside. The eroding drainage flows directly into the headwaters of Clayton Creek, a known brook trout stream that empties into Lake Superior, and was transporting large sediment loads that could impact trout habitat. An engineering plan for a rock and grassed waterway to correct the erosion was developed by NRCS staff that considered the site a resource concern following a site visit. Waterway construction including the installation of geotextile fabric, rock, and grass along with slope reshaping, occurred during summer 2016. NRCS-EQIP program funding assisted with costs of installing the waterway structure.



## Eagle Bay Wetland Enhancement

Through funding provided by BIA-GLRI and NRCS-EQIP, Red Cliff completed a wetland enhancement project located near Eagle Bay during fall 2016. Using a water level control structure, the wetland will have increased holding capacity allowing reduced stream flow velocity downstream where road flooding occurs during spring runoff and heavy rainfall. As a result, we anticipate lower sedimentation rates entering the Raspberry River system from this tributary. Formerly, this site had more of an open water wetland component from beaver dams that held back water. As a result, this was a popular area for Red Cliff Tribal members to harvest wild rice, hunt and watch waterfowl, and other activities. Through time, the old beaver dams degraded and the open water component of the wetland decreased greatly.



*Berm structure with wetland area that will hold water*



*Berm structure for holding water*

## Legendary Waters Erosion

The TNR Division first documented the erosion concern that was occurring at the site near Legendary Waters Casino in 2012. The problem was created by storm water outflows from the Legendary Waters parking lot, the road ditch on Hwy 13, and a storm water culvert from the west side of the road all converging at this location. An estimated 500 cubic yards of soil eroded into Buffalo Bay at this site, making the bay shallower, covering up lakebed habitat for many aquatic species, washing excess nutrients into the bay, preventing photosynthesis of aquatic plants that provide oxygen for fish, and damaging water quality. The site ranked as a high resource concern with NRCS and an engineering plan was developed to correct the erosion. The project was completed in 2015 and was reported in that years' BIA annual report. Since then, we noticed a small area that wasn't completely stabilized and could use additional riprap to prevent future problems. During summer 2016, Red Cliff TNR purchased a small amount of riprap and placed the rock in the area of concern to address the potential issue.



**Before (above), After (below)**



*Original erosion and project from 2015*



## Chicago Creek Fish Ladder

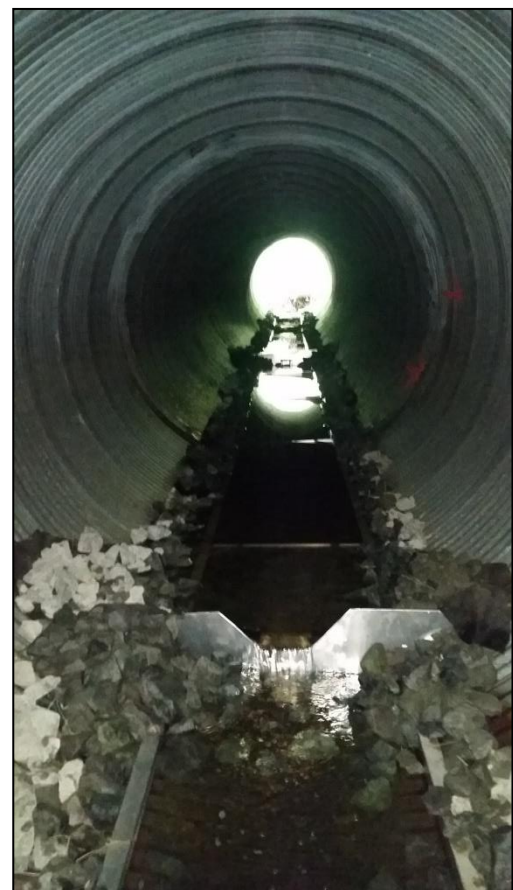
Chicago Creek is one of only a few Red Cliff streams where water quality, temperature, and other habitat factors all align, allowing native brook trout to exist. However, there's long been an impediment to the movement of trout throughout this stream system: the Blueberry Road culvert. The Treaty Natural Resources Division (TNR) has had this culvert barrier on their radar for many years, and in fact, previous projects attempted to address the problem of fish passage.

A few years ago, a rock weir system designed to raise the water level through a series of pools was installed at the downstream end of the culvert. Fish located downstream now had access into the culvert, which was previously perched above the actual stream level, and then on to the upstream reaches of the creek. Although the system did indeed raise the water level, we found that during low flow periods the water level inside the culvert was still too low to allow fish passage through its entirety.

At 180 feet in length, the Blueberry Road culvert is a difficult place for fish to navigate. It's man-made and dissimilar to the rest of the stream habitat fish are familiar with, while low water levels and no natural substrate leave fish feeling exposed to predation or unable to physically swim any farther. To remedy this, we would need to pool the water inside the culvert similar to the downstream weir system.

We worked with an engineering firm to develop a baffle system throughout the culvert that would pool water and provide optimal levels even during low flow. Between the baffles, we placed rock to provide additional water flow disturbance and small resting and hiding locations for the fish as they make their journey up the culvert. Although it's not a natural bottom, such as a bridge provides, we feel this structure with the added rock and sediment that fills in through time will be very beneficial to trout movement throughout Chicago Creek.

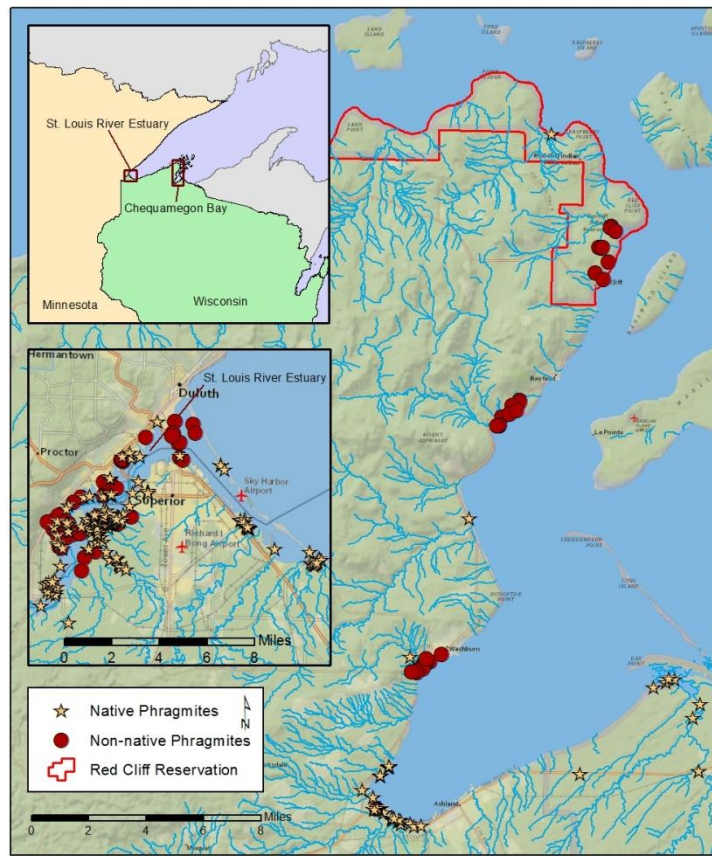
Over a period of two days in mid-September, TNR staff installed the fish ladder system and early observations suggest we successfully raised water levels throughout the culvert. Hopefully, the brook trout approve!



## Phragmites Genetic Study

The Red Cliff Band of Lake Superior Chippewa manage a wastewater treatment plant (WWTP) that utilizes non-native *Phragmites australis* (subspecies *australis*) in constructed reed beds as part of a sludge dewatering system. This management (phytoremediation) tool has been approved by many state and federal permitting authorities and is used at numerous WWTPs throughout Wisconsin, including Red Cliff and the neighboring Lake Superior Chequamegon Bay coastal communities of Bayfield and Washburn. In 2013, numerous small, isolated external populations of non-native *Phragmites* were discovered adjacent to all three community WWTPs (Washburn, Bayfield, and Red Cliff). All populations were within 1 mile of each WWTP with no other non-native populations found in the area despite monitoring by multiple area partners. The nearest known established population of non-native *Phragmites* is 75 miles west in the St. Louis River estuary of Superior, WI/Duluth, MN. Because the threat of invasion into coastal wetlands is high, many local partners, including Red Cliff, initiated a rapid response to eradicate the isolated populations. Red Cliff TNR also led a genetic study to determine whether the isolated populations originate from the reed beds. Final genetic results are pending at the time of this reporting, but preliminary results appear to show likely origination from reed beds. Additionally, Red Cliff TNR coordinated a related feasibility study of WWTP alternative technologies to using non-native *Phragmites* at the three community WWTPs. As a result of these efforts, all three communities have committed to transitioning their WWTP reed beds to the native subspecies of *Phragmites* (*Phragmites australis* subsp. *americanus*).

Chequamegon Bay and St. Louis River Estuary  
Native and Non-native *Phragmites* Locations (Pre-Control)



Collecting *Phragmites* genetic samples



### Bluebird box Installation

In an effort to provide nesting habitat for the Eastern Bluebird (*Sialia sialis*), Red Cliff TNR built and installed 20 bluebird houses at the Minobimaadiziwin Gitigaanin Tribal Farm during 2016. Funding assistance was provided by the NRCS EQIP program. TNR staff and youth summer interns will monitor the bluebird houses for species usage.

Red Cliff Eastern Bluebird Box Locations - 2016



### Bat Box Installation

In addition to TNR efforts to provide habitat for the Eastern Bluebird, staff also built and installed bat houses at two locations on the reservation during 2016. This adds to our two previous bat boxes installed during 2015. TNR staff and youth summer interns will monitor the bat boxes for use using a thermal imaging camera.





## Invasive Species Program

During 2016, Red Cliff TNR entered their third year of coordinating an on-reservation invasive species monitoring and control program funded through GLRI and administered by Wisconsin Tribal Conservation Advisory Council (WTCAC). This successful program has allowed TNR to hire tribal seasonal employees to assist with the goal of reducing or eradicating invasive species on the Red Cliff reservation. This year's work plan included follow-up treatment at numerous isolated populations which are now near eradication, along with continued efforts to keep slightly more widespread species at lower numbers. Priority species for control that are nearing eradication include *Phragmites*, Japanese and giant knotweed, and leafy spurge. These species require continued effort to ensure eradication is complete. Other species such as purple loosestrife, Canada and bull thistle, and spotted knapweed, are more widespread around the reservation but in relatively low numbers. These species aren't likely candidates for eradication but nevertheless, control efforts appear to keep populations from expanding at alarming rates. During this year's field season, TNR



*Common buckthorn with seedlings underneath*



*Garlic mustard rosettes at Bayfield compost site*

discover a population of common buckthorn, a newly documented species for the Red Cliff reservation. All large, fruit bearing and medium sized buckthorn were cut and treated chemically over an approximate 20 acre area. Small seedlings were pulled but follow-up monitoring and control is needed for the sizable seed bank likely to produce additional seedlings. Eradication is possible since the area appears isolated to near the tribal farm. However, seed dispersal by birds and other animals may be beyond our initial delimiting survey area and there is possibility of finding additional pockets of buckthorn. Another newly documented species, garlic mustard, was discovered by TNR staff off-reservation but in close proximity at the City of Bayfield community leaf and compost site and wood debris dump. These small populations were pulled by TNR staff while signs warning community members of the garlic mustard threat were posted on site. Other off-reservation activities included assisting the Northwoods Cooperative Weed Management Area (NCWMA) partners with control of garlic mustard along the Bad River in Ashland County and a roadside population of wild parsnip in Iron County.

## **Aquatic Invasive Species Management Plan**

Red Cliff TNR is funded through the US Fish and Wildlife Service (USFWS) to develop an aquatic invasive species (AIS) management plan for reservation land and water. The plan is scheduled to be finalized by end of March, 2017. As mentioned in the invasive species program section, TNR staff is active with local and regional partners in addressing AIS and terrestrial invasive species issues including the NCWMA, GLIFWC, the Bayfield County AIS Committee, and the USFWS.